7.1 General principles

Given the difficulties of cleaning up oil at sea, many oil spills result in contamination of shorelines. The oil which reaches the coast generally has the greatest environmental and economic impact. It also determines to a large extent the political and public perception of the scale of the incident, as well as the costs.

The principal aim of the shoreline clean-up operation is to reduce the pollution to a tolerable level. The difficulty in achieving this simple aim and the level of remaining pollution that could be described as 'tolerable' will depend on the type of shoreline and other local factors. However, it should be borne in mind that in any clean-up operation, a point will be reached where little will be gained from further expenditure of resources and the residual traces of oil are best left to degrade naturally.

A second aim is therefore to restore the coastline with the least impact on the environment. It is essential that the local authority contingency plan has been prepared in collaboration with the relevant statutory conservation bodies, fisheries departments and other organisations concerned, in order that the limitations of shoreline clean-up have been appreciated. The plan should indicate areas for special consideration such as Sites of Special Scientific Interest (SSSI), where some clean-up methods might be deemed to be unacceptable. Indeed, there may be areas where any clean-up action will be detrimental to the environment and any stranded oil will have to be left to degrade naturally. The rate of natural degradation will depend on the ambient temperature and the sea state to which the stranded oil is subjected. In cold climatic conditions and areas with low energy surf, the degradation could take several years.

Where it is decided that a clean-up operation is necessary, the main option is to recover the oil from the water or the shoreline and temporarily store the recovered oil and oily waste near the site, pending subsequent transport to intermediate storage sites and final disposal. The most appropriate technique for shoreline clean-up will depend on the location, type and amount of oil and the facilities available to deal with it. Detailed guidance on clean-up techniques for various types of shoreline is given in Chapter 10. However, there are a number of general considerations that are common to all clean-up operations:

Access points

The contingency plan should identify suitable access points for equipment and vehicles. The relevant statutory nature conservation body should be consulted beforehand where this might involve damage to the beach environment, e.g. cutting through dunes.

Temporary storage of waste

Before commencing recovery operations it is important to make suitable provision for the temporary storage of oily wastes. Possible sites for temporary storage should be included in the contingency plan, as should final disposal routes for wastes arising from clean-up operations.

Removal of pollution

It is desirable to remove the gross pollution from surfaces while the tide is still ebbing. As much as possible of the oil or emulsion should be removed as quickly as possible before the next tide deposits more oil at the same location. In a large oil spill incident it is possible that the coastline could be subjected to prolonged re-contamination over several tides. It is advisable to remove stranded oil after each tide because subsequent tides may wash all or part of the oil to shores in the vicinity that would otherwise have escaped pollution.

The success of recovery operations will depend on:

- The type of beach material;
- The type of equipment used; and
- Supervision of the operation.

Care taken in choosing the right technique, together with careful supervision, will ensure that the amount of oiled beach material requiring final disposal is kept to a minimum.

REMEMBER: FINAL DISPOSAL PROBLEMS START ON THE BEACH.

7.2 Estimating oil movement at sea towards the shoreline

When a significant spill occurs at sea there is usually an urgent requirement to try and predict its movement and estimate whether or not shoreline pollution is likely to occur and if it will pollute the shoreline, the most likely point of impact. Oil will travel downwind at approximately 3% of the wind speed. Superimposed on this is the effect of the current which is usually calculated as 100% of the current vector. Thus, with the relevant nautical chart, dividers and information on wind strength and direction, rough estimates of slick movement can be obtained manually by drawing vector diagrams (see Figure 38).

Much quicker and more accurate predictions of spilled oil movement can be made using computer modelling systems. The MCA has such systems and as soon as confirmed reports of the spill are received a computer simulation will be run. If the computer predicts that shoreline pollution is probable, the local authorities likely to be affected will be notified by the MCA.

In the event of a significant spill the MCA will also use surveillance aircraft to provide information on the progress of oil slicks and provide estimates of likely areas of shoreline impact. In addition to this, the affected local authority will usually position spotter personnel at strategic locations along the coast to provide early warnings of oil beachings.

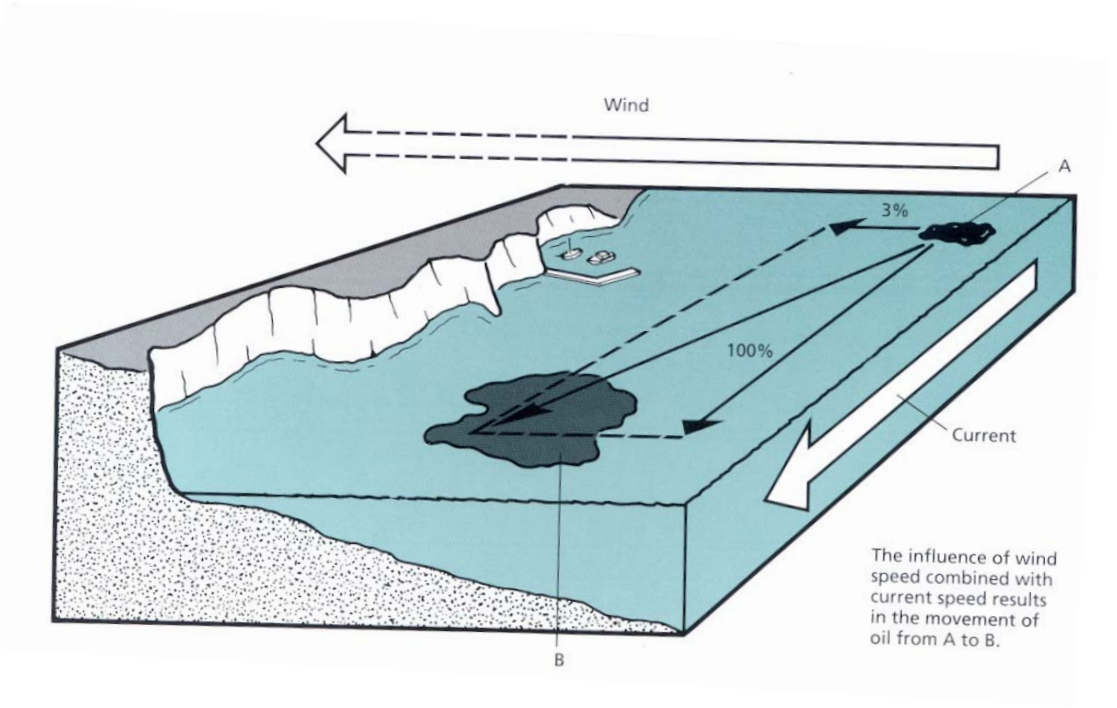

Figure 38 Oil slick movement vector

7.3 Survey and reporting of polluted shorelines

One of the first requirements, after oil has come ashore, is to assess the amount and extent of oil pollution.

This information is gathered by the Shoreline Clean-up Assessment Team (SCAT) and is reported on a SCAT form to the SRC. This information is essential for the correct allocation of manpower and equipment resources to the beach clean-up. If the SCAT cannot provide this level of detail, it will be possible to categorise the oiled shoreline as 'heavily', 'moderately' or 'lightly' oiled. A photographic record should also be obtained, both for in-house operational use and also for record purposes in association with any compensation claim.

The SCAT form is as follows:

SHORELINE POLLUTION SURVEY AND CLEAN-UP ASSESSMENT

Shoreline Segment…… Date……..Time……..To…….

Surveyor Name……Organisation…….. Tel No……

Surveyor Signature…….. …… SRC/LA Briefing: Yes/No

Location: Grid Ref…… Latitude/Longitude……

Weather: Sun / Cloud / Fog / Rain / Snow **State of tide:** High / Rising / Falling / Low

State of Sea: Calm / Moderate / Rough / Very Rough

Photographs taken: Roll # …… Frames…… to…… Roll #..... Frames…… to……..
(indicate location & direction on map)

Surface Oil: (indicate areas on map and allocate identifier – definition of abbreviations on reverse of this form)

	Area		**Cover**	**Oil Thickness**						**Oil Characteristics**							**Tidal Zone**					
	Length (m)	Width (m)	%	PO	CV	CT	ST	FL	FR	MS	TB	TC	SR	AP	NO	DB	S	U	M	L	Slope	Substrate
A																						
B																						
C																						
D																						

Subsurface oil: (indicate location of pit on map and allocate identifier – definition of abbreviations on reverse of form)

Pit	**Tidal Zone**				**Oiled zone depth**			**Characteristics**								
S	U	M	L	Pit Depth (cm)	Top	Bottom	AP	OP	PP	OR	TR	NO	Depth of water table (cm)	Sheen Colour	Substrate
1																
2																
3																
4																
5																

Is the oil likely to remobilise: Yes/No If Yes Sheen/Bulk (indicate on map)

Is there any floating oil: Yes/No If Yes Sheen/Bulk (indicate on map)

Will next tide movement move oil: out to sea/on to the shore/unknown

Samples taken: Yes/No (indicate sampling position on map)
Type of sample e.g. water, emulsion, sand, shellfish etc

Sample Code 1…….. Time…….. Type……
Sample Code 2…….. ……..Time…….. Type……
Sample Code 3…….. Time……Type……

Sample code should include site name/date/unique number

Summary of Oil Present:

Any known resources impacted e.g.

Live oiled birds (contact response centre) Dead oiled birds……
Live oiled marine mammals (contact response centre) Dead oiled marine mammals……

Mass strandings of marine species e.g. Shellfish Boats/Marinas

Public amenity Water intakes……
Other: (specify)

Is the Contingency Plan still appropriate: Yes/No

If No, outline the operational and environmental constraints for clean-up.

Operational:

Environmental:

Is clean up required: Yes/No If Yes, indicate rationale, technique and resources required.

Other Information:

Shoreline Segment…… Date…….. Time…….. To……

Indicate position of:

Stranded oil	Strandline	photo no. and direction	floating oil	Sea/shore interface
A 	Strandline 		B 	S/S interface 

Include: **Scale** and the **direction of North**
Substrate types (sand, shingle, boulder, mud, seawall, pebble, hard cliff, soft cliff, rock)
Prominent features (Boulders, streams, trees, fences, paths, caves, jetties etc.)
High water and **low water** marks

Definitions - Surface Oil

Oil Thickness

PO Pooled Oil (>1cm thick)
CV Cover (0.1cm - 1cm)
CT Coat (0.01cm - 0.1cm)
ST Stain (<0.01cm thick)
FL Film (transparent/translucent film)

Oil Characteristics

FR Fresh
SR Surface Oil Residue (non cohesive, oiled surface sediments
MS Mousse (emulsified oil and water)
AP Ashalt Pavement (cohesive mixture of oil and sediments)
TB Tar Balls (dia. = <0.1m) or Mousse Patties (dia. 0.1 - 1.0 m)
TC Tar (weathered coat/cover of tar)
DB debris.
NO No Oil

Tidal Zone

S Splash zone; U Upper shore, M Mid shore, L Lower shore.

Slope

V Vertical (>90°); VS Very Steep (61 - 90°); Steep (31 - 60°); M Moderate (5-30°); F Flat (<5°)

Substrate

Seawall, Hard Cliff, Soft Cliff, Rock, Boulder, Pebble, Shingle, Sand, Mud, Marsh.

% Cover - visual aid

Definitions - Sub-surface Oil

Tidal Zone

See definitions for surface oil

Characteristics

AP Asphalt Pavement (cohesive mixture of weathered oil & sediment below the surface)
OP Oil-filled pores (pore spaces between the sediments are completely filled)
PP Partially filled pores (pore spaces filled with oil but no visible oil flow if disturbed)
OR/C Cover (>0.1 - 1 cm) or Coat (0.01 - <0.1cm) of oil residue. (Easily removed with fingernail)
OR/S Stain (<0.01 cm). (Can not be easily removed by fingernail)
TR Trace. (Discontinuous film of oil on sediments or an odour/tackiness without visible oil)
NO No Oil.

Sheen

S Silver sheen, R Rainbow sheen, B Brown sheen

Substrate

See definitions for surface